III. THE FIRM AND THE MARKETPLACE

A. The Firm and its Costs

1. Some important distinctions

   a. Revenues versus costs

   b. Fixed versus variable inputs

   c. Short-run versus long-run

   d. Explicit versus implicit costs

   e. Accounting versus economic profit

2. The objective of a firm is to maximize economic profits.

   Profits = Total Revenue - Total Cost = P*Q - TC

   Rule: a firm will sell a good so long as the marginal revenue (MR) exceeds the marginal cost (MC).

   a. Market constraints

   b. Cost constraints

3. Short-run cost constraints

   a. In the short-run, a firm can only alter its variable input -- labor.

   b. The firm’s production function

      • Output \((Q)\) -- The total amount of output produced by various amounts of labor (variable input) with a given quantity of capital (fixed input).

      • Labor \((L)\) -- The amount of labor (variable input) needed to combine with a given quantity of capital (fixed input) to produce the output.
- Marginal product of labor (MPL) -- The additional amount of output produced by employing one more unit of labor (variable input) to a given quantity of capital (fixed input).

- Law of diminishing returns -- as a firm applies more of a variable input, such as labor, to a given quantity of a fixed input, such as capital, the marginal product of the variable input eventually diminishes.

c. The firm's cost curves

- Variable cost (VC) -- the total cost of the variable inputs.
- Fixed cost (FC) -- the total cost of the fixed inputs.
- Total cost (TC) -- the total cost of all inputs.
- Average total cost (ATC) -- the average cost per unit of output.
- Average variable cost (AVC) -- the average cost per unit of output.

B. Price Takers

1. A competitive market is an industry where many firms produce a similar product.

2. In a competitive market, a firm sells as much or as little of its good or service at the market price. In other words, a firm takes its price as given.

3. In the short-run, a firm must decide the profit-maximizing quantity \( Q \) and whether to produce that quantity or shutdown.

   a. Profit-maximizing quantity is that amount where MR = MC.
      - The MR equals the market price.
      - The MC is determined by the cost constraints.

   b. A firm will produce in the short-run so long as it can cover its variable costs.
4. In a short-run equilibrium, firms can be earning either economic profits, breaking even or suffering economic loses.

5. In the long-run, a firm must decide whether or not to remain in the industry.
   a. A firm will remain in the long-run so long as it can cover its total costs.
   b. Firms will exit if earning negative economic profits.
   c. Firms will enter if earning positive economic profits.

6. In a long-run equilibrium, firms produce at the minimum point of the average total cost curve and break even.
   a. There is Pareto efficiency.

7. An example

C. Price Makers

1. A monopolistic or imperfectly competitive market is an industry where firms produce a differentiated product.

2. In an imperfectly competitive market, a firm faces a downward sloping demand curve. Therefore, a firm can raise its price but only by selling less of its good or service.
3. In the short-run, a firm must decide the profit-maximizing price \( P \) (or \( Q \)) and whether to produce at that price or shutdown.

   a. Profit-maximizing quantity is that amount where \( MR = MC \).
      
      - The \( MR \) falls as a firm produces more.
      - The \( MC \) is determined by the cost constraints.

   b. A firm will produce in the short-run so long as it can cover its variable costs.

4. In a short-run equilibrium, firms can be earning either economic profits, breaking even or suffering economic losses.

5. In the long-run, a firm must decide whether or not to remain in the industry.

   a. A firm will remain in the long-run so long as it can cover its total costs.

   b. Firms will exit if earning negative economic profits.

   c. Firms will enter if earning positive economic profits.

6. In a long-run equilibrium, firms produce above the minimum point of the average total cost curve and break even.

   a. There is not Pareto efficiency.

7. An example